

REMARKS

The Applicant has included a new Information Disclosure Statement (IDS) in response to the error noted by the Examiner in the earlier IDS filed on 3/12/02. The enclosed IDS contains the corrected USPN number for the Arathorn reference as noted by the Examiner in the Office Action. The Arathron reference considered by the Examiner in his examination was the correct reference.

With reference to the Drawings, the Applicant has made changes to the Drawings in response to the objections raised by the Examiner in the Office Action.

With reference to the Specification, the Applicant has made changes to the Specification, based on the Examiner's recommendation, in response to the objections raised by the Examiner in the Office Action.

With reference to the claims, Claims 1-4 are canceled. Claims 5-8 have been rewritten in the independent form including all of the limitations of base claim, Claim 1, which has been canceled in the current amendment. Changes have also been made to Claims 5-9 in response to the Examiner's objections. Claims 10-17 have are newly added claims.

The Examiner has rejected claims 1-4 under 35 U.S.C. 103 (a) as being unpatentable over *Wang* et al USPN 5,566,092 (October 15, 1996) in view of *Neves* et al "An artificial neural network-genetic based approach for time series forecasting" (3-5 Dec. 1997). Claims 1-4 have been canceled.

The Examiner has rejected claims 5-9 under 35 U.S.C. 103 (a) as being unpatentable over *Wang* et al USPN 5,566,092 (October 15, 1996) in view of *Neves* et al "An artificial neural network-genetic based approach for time series forecasting" (3-5 Dec. 1997) and further in view of *Pires* "Remote Monitoring and Inspection of Robotic Manufacturing Cells" (8-12 July 2001).

With reference to the aforementioned rejection of claims 5-9, under 35 U.S.C. 103(a), a Declaration under 37 CFR 1.1.31 is attached herewith. The Declaration

includes two invention reports that show conception and possession of the invention by the inventor prior to the effective date of the *Pires* “Remote Monitoring and Inspection of Robotic Manufacturing Cells” reference, dated 8- 12 July, 2001 (hereinafter referred to as the *effective date of reference*). The first invention report is titled “Production pattern-recognition Artificial Neural Net (ANN) with event-response Expert System (ES) [YIELDSHIELD]” (hereinafter referred to as *Exhibit 1*) and is dated September 26th, 2000. The second invention report is titled “Advanced Production Test System for 3 Second Cycle Time Cellular Handset Production Line” (hereinafter referred to as *Exhibit 2*) and is dated October 6th, 2000. *Exhibit 1* and *Exhibit 2* formed the basis for the regular utility application filed on August 6th, 2001 and predate the *effective date of reference*.

Exhibit 1 and *Exhibit 2* show possession (i.e., the basic inventive concept) of the invention in Claims 5-9, prior to the *effective date of reference* of the *Pires* reference. Description/text from *Exhibit 1* and *Exhibit 2* are reproduced below, within quotes, to demonstrate possession of the subject matter falling with the claims prior to the *effective date of reference*. In the following paragraphs, the Applicant establishes possession (i.e., the basic inventive concept) of the invention in the following sequence: Claim 1, followed by Claims 5-8 and finally Claim 9.

Regarding Claim 1, the following text from *Exhibit 1* and *Exhibit 2*, teaches an artificial neural network (ANN) for recognizing and classifying production yield patterns.

“The ANN recognizes and classifies production yield patterns occurring at individual tester, complete test stage, and production line test aggregation and executes a proscribed range of responses. The ANN will automate human statistical analysis and line monitoring functions, identify emerging yield trends, identify proximate cause of a yield-degrading event, classify event severity, and provide conclusional accuracy.” (*Exhibit 1*, Section 2, page 3)

“..... Various required measurements, tests, and software instructions are conducted wireless in a distributed fashion while the DUT advances through the process.....Other distributed tests include camera verification of component placement within tolerance windows, electrical contact presence..... Overall measurement results are monitored by an AI in near real-time.” (*Exhibit 2*, Section 2, pg 3)”

Regarding Claim 1, the following text from *Exhibit 1* and *Exhibit 2* teaches an expert system (ES) coupled to said artificial neural network to provide a knowledge base and apply cognitive heuristics to execute responses based on production yield patterns information received from said artificial neural network.

“Artificial Neural Net (ANN) coupled with an Expert System (ES) which monitors production test plans in real-time. The ES, based on recognized or inferred conditions provided by the ANN, consults it's knowledge base and applies cognitive heuristics to execute reponses in the manner described by the human expert it is modeled after.” (*Exhibit 1*, Section 2, page 3)

“Advanced process for moving..... Various required measurements, tests, and software instructions are conducted wireless in a distributed fashion while the DUT advances through the process..... Overall measurement results are monitored by an AI in near real-time. Yield and process trend patterns are identified/reacted to according to established rule-sets governing process situations and/or notification of human authorities.” (*Exhibit 2*, Section 2, pg 3)

“ Current test/production Artificial Intelligence decision support systems monitor yields and production trends. This automates the monitoring process in near real-time (updates every 5 minutes). An experienced human monitoring the process with undivided attention is still unable to effectively

monitor and identify a yield-threatening trend.inter-relationships between test stages.” (*Exhibit 2*, Section 3, pages 3-4)

“Advantages: This inventionAn AI monitoring system automates multiple human monitoring tasks. An Artificial Neural Network (ANN) can classify a trend, recognize a pattern at 3-5 instances, hand off to an Expert System (ES) which can page or e-mail a technician, provide event statistics to support the conclusion and even take an erratic fixture offline. The ANN can also recognize a seemingly unrelated test value is erratic or different from values in passing DUTs, thereby interpolating an inter-dependency or trend indicator previously unrecognized..... robust processor and memorizer.” (*Exhibit 2*, Section 5, pages 4- 5)

“Advanced process for moving.....Yield and process statistics are monitored near real-time by an Artificial Intelligence (AI) package, which incorporates the associate knowledge of Artifical Neural Nets (ANN) with the cognitive rule-based behavior of an Expert System (ES). The AI identifies patterns or trends and reacts according to established rule-sets governing process situations. Reactions range from notification of human authorities to alarms and even process alteration.” (*Exhibit 2*, Section 7, pages 5-6).

Regarding Claim 5, the following text from *Exhibit 1* and *Exhibit 2* teaches instructions to send a report to predetermined individuals.

“These responses may include a summary report electronically to the correct individuals, a voice/pager message to the individuals responsible to react to an event, a visual or audible alarm at the event site, and/or direct adjustment of the production process” (*Exhibit 1*, Section 2, page 3)

“An AI monitoring system....., hand off to an Expert System (ES) which can page or e-mail a technician, provide event statistics to support the

conclusion and event statistics.....” (*Exhibit 2*, Section 5, pg 5, 2nd paragraph)

“Yield and processReactions range from notification of human authorities to alarms and even process alteration.” (*Exhibit 2*, Section 7, pg 6, 5th paragraph)

Regarding Claim 6, the following text from *Exhibit 1* and *Exhibit 2* teaches instructions to provide an alarm signal.

“.....a visual or audible alarm at the event site, and/or direct” (*Exhibit 1*, Section 2, page 3)

“.....Reactions range from notification of human authorities to alarms and even process alteration.....” (*Exhibit 2*, Section 7, pg 6, 5th paragraph).

Regarding Claim 7, the following text from *Exhibit 1* and *Exhibit 2* teaches instructions to send a pager message to predetermined individuals.

“.....These responses may include a summary report electronically to the correct individuals, a voice/pager message to the individuals responsible to react to an event, a visual or audible alarm at the event site, and/or direct adjustment of the production process.” (*Exhibit 1*, Section 2, page 3)

“An AI monitoring system....., hand off to an Expert System (ES) which can page or e-mail a technician, provide event statistics to support the conclusion and event statistics.....” (*Exhibit 2*, Section 5, pg 5, 2nd paragraph)

Regarding Claim 8, the following text from *Exhibit 1* and *Exhibit 2* teaches instructions to adjust the production process in accordance with the knowledge base of the system.

“The ES, based on recognized or inferred conditions provided by the ANN, consults it's knowledge base and applies cognitive heuristics to execute reponses.....These responses may include a summary report electronically to the correct individuals, a voice/pager message to the individuals responsible to react to an event, a visual or audible alarm at the event site, and/or direct adjustment of the production process.” (*Exhibit 1*, Section 2, page 3)

“An AI monitoring system....., hand off to an Expert System (ES) which can page or e-mail a technician, provide event statistics to support the conclusion and even take an erratic fixture off-line.....” (*Exhibit 2*, Section 5, pg 5, 2nd paragraph).

“Yield and process statistics are monitored near real-time by an Artificial Intelligence (AI) package, which incorporates the associate knowledge of Artifical Neural Nets (ANN) with the cognitive rule-based behavior of an Expert System (ES). The AI identifies patterns or trends and reacts according to established rule-sets governing process situations. Reactions range from notification of human authorities to alarms and even process alteration.” (*Exhibit 2*, Section 7, pg 6, 5th paragraph).

Regarding Claim 9, *Exhibit 1* and *Exhibit 2* teaches recognizing a plurality of production yield patterns.

“The ANN recognizes and classifies production yield patterns occuring at individual tester, complete test stage, and production line test aggregation and executes a proscribed range of responses. The ANN will automate human statistical analysis and line monitoring functions, identify emerging yield trends, identify proximate cause of a yield-degrading event, classify event severity, and provide conclusional accuracy.” (*Exhibit 1*, Section 2, page 3)

“..... Various required measurements, tests, and software instructions are conducted wireless in a distributed fashion while the DUT advances through the process.....Other distributed tests include camera verification of component placement within tolerance windows, electrical contact presence..... Overall measurement results are monitored by an AI in near real-time.” (*Exhibit 2*, Section 2, pg 3)”

Regarding Claim 9, *Exhibit 1* and *Exhibit 2* teaches classifying at least one of said production yield patterns into at least one production yield trend.

“An ANN can identify and classify the same trend, recognize the pattern at 3-5 failures (in this example about 24 phones),..... The ANN can also recognize a seemingly unrelated test value is erratic or different from values in passing DUTs, thereby interpolating an inter-dependancy or trend indicator previously unrecognized.” (*Exhibit 1*, Section 5, page 4)

“.....Overall measurement results are monitored by an AI in near real-time.Yield and process trend patterns are identified/reacted to according to established rule-sets governing process situations and/or notification of human authorities.” (*Exhibit 2*, Section 2, page 3)

Regarding Claim 9, *Exhibit 1* and *Exhibit 2* teaches weighting said at least one production yield trend.

“....Weights trends at each stage, and correlations between stages.”
(*Exhibit 1*, Section 6, page 4)

Regarding Claim 9, *Exhibit 1* and *Exhibit 2* teaches providing notification to expert system (ES) when at least one of said weighted trends passes a predetermined yield-degrading threshold value.

“.....Reports pattern recognition when conclusional accuracy is above a specified threshold....” (*Exhibit 1*, Section 6, page 4)

"Artificial Intelligence decision support systems monitor yields and production trends. This automates the monitoring process in near real-time (updates every 5 minutes). An experienced human monitoring the process with undivided attention is still unable to effectively monitor and identify a yield-threatening trend." (*Exhibit 2*, Section 3, pages 3-4)

Regarding Claim 9, *Exhibit 1* and *Exhibit 2* teaches executing responses from said expert system (ES) in accordance with said expert systems knowledge base

"Expert system consults knowledge base for rules governing response to ANN recognized pattern, and executes applicable responses." (*Exhibit 1*, Section 6, page 4)

The Applicant therefore requests the removal of the *Pires* reference and the allowance of amended Claims 5-9. Applicant believes that allowance of Claims 5-9 should result in allowance of dependent Claims 10-11 and Claims 13-17.

Claim 12 is a newly added independent claim, that has support in the specification as filed, which the Applicant believes is in condition for allowance for reasons cited in the previous paragraphs. No new matter has been added.

A Notice of Allowance is therefore respectfully requested by the Applicant.

Respectfully submitted,

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